

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method for defining the degree of fullness in a mill and ~~a~~ the load toe angle (ϕ_k), where there are used oscillations directed to the mill electric motor, in order to define the toe ~~(4)~~ of the mill load composed of the mass to be ground, ~~characterized in that~~ wherein from the obtained measurements ($P(n)$), there is defined ~~a~~ the ~~phase (θ)~~ of the mill oscillation phase (θ) by using a frequency domain analysis, and that by means of the mill oscillation phase (θ), there is defined the load toe angle (ϕ_k).

2. (Currently Amended) A method according to claim 1, ~~characterized in that~~ wherein in the frequency domain analysis of the mill oscillation, there is used oscillation related to the mill power draw.

3. (Currently Amended) A method according to claim 1, ~~characterized in that~~ wherein in the frequency domain analysis of the mill oscillation, there is used oscillation related to the mill torque.

4. (Currently Amended) A method according to claim 2, ~~or 3,~~ ~~characterized in that~~ wherein the frequency domain analysis of the mill power oscillation is carried out by means of a Fourier transformation.

5. (Currently Amended) A method according to ~~any of the preceding claims,~~ ~~characterized in that~~ claim 1, wherein in order to make the degree of fullness of the mill and the load toe angle (ϕ_k) independent of the fluctuations in the mill rotating speed, in each measurement there is measured the current angle of rotation of the mill, and by this measurement of the current angle of rotation, there

are taken into account the speed fluctuations in the signal to be analyzed in frequency domain.

6. (Currently Amended) A method according to ~~any of the preceding claims 1 — 4, characterized in that~~ claim 1, wherein in the measurement of the angle of rotation, part of the angles of rotation of the mill are measured, and part are calculated from the measured angles by linear interpolation.

7. (Currently Amended) A method according to ~~any of the preceding claims, characterized in that~~ claim 1, wherein when defining the degree of fullness by means of the load toe angle, there is applied a mathematical model, such as the JKMRC model.

8. (Currently Amended) A method according to ~~any of the preceding claims, characterized in that~~ claim 1, wherein in both the power measurement used when defining the mill degree of fullness, as well as the degree of fullness as such, are utilized in order to calculate the ball charge of the mill.

9. (Currently Amended) A method according to ~~any of the preceding claims, characterized in that~~ claim 1, wherein the mill load toe angle used when defining the mill degree of fullness can be utilized in order to improve the grinding efficiency of the mill, when the point of impact of the grinding media is calculated by a mathematical model.